


Notice of Allowability	Application No.	Applicant(s)	
	10/621,696	LIOU, HUEY-CHIANG	
	Examiner	Art Unit	
Nitin Parekh	2811		

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--
All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS. This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12-13-04.
2. ☒ The allowed claim(s) is/are 2,4-11,13-20,22-25 and 28-31.
3. ☒ The drawings filed on 16 July 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____ |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|


Nitin Parekh
Primary Examiner
Technology Center 2800

DETAILED ACTION

Allowable Subject Matter

1. Claims 2, 4-11, 13-20, 22-25 and 28-31 are allowed.
2. Cancel claims 12, 26 and 27.
3. Claims 1, 3 and 21 have been canceled.

Examiner's Amendment

4. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.
 - A. Cancel claims 12, 26 and 27.
 - B. Claim 2, line 16: Delete "sacrificial" and Insert --- "the sacrificial" ---.
 - C. Claim 2, line 22: Delete "sacrificial" and Insert --- "the second sacrificial" ---.
 - D. At the end of claim 2, line 23: Insert --- "and forming vertical support structures peripheral to the conductive vertical series, wherein removing portions of the sacrificial dielectric decomposition product further forms air gaps between the vertical support structures and the conductive vertical series." ---.
 - E. Claim 13, line 1: Delete "claim 12" and Insert --- "claim 2" ---.

- F. At the end of claim 29, line 16: Insert --- “positioning a first capping layer adjacent to the surfaces of the two additional conductive layers and applying a tensile load in a direction substantially parallel to a substrate layer to the first capping layer such that the first capping layer is adhered to the two additional conductive layers separated by the air gap” - --.

Authorization for this examiner's amendment was given in a telephone interview with Michael Bernadickou on 08-04-05.

Reasons for Allowance

5. The following is an examiner's statement of reasons for allowance:

The references of record do not teach either singularly or in combination at least the limitations “vertical support structures peripheral to the conductive vertical series and isolated from the conductive vertical series by air gaps wherein none of the peripheral vertical support structures are between the at least two conductive vertical series” and “a capping layer adjacent to and above upper surfaces of the vertical support structures” in an air gap interconnect structure having at least two conductive vertical series adjacent the substrate layer wherein each conductive vertical series having a plurality of conductive layers is isolated from each other by air gaps defined by side walls of the conductive vertical series; or “the interconnect comprising conductive layers positioned

in at least two conductive vertical series, the conductive vertical series isolated from each other by sacrificial dielectric material; forming a protective layer adjacent the interconnect; patterning the protective layer to expose portions of the sacrificial dielectric material; decomposing portions of the sacrificial dielectric material to form a sacrificial dielectric decomposition product; removing portions of the sacrificial dielectric decomposition product to form air gaps between the conductive layers" and "forming vertical support structures peripheral to the conductive vertical series, wherein removing portions of the sacrificial dielectric decomposition product further forms air gaps between the vertical support structures and the conductive vertical series" in a method of forming an air gap in a multi-layer interconnect.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 571-272-1663. The examiner can normally be reached on 09:00AM-05:30PM.

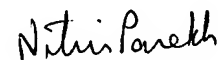
If attempts to reach the examiner by telephone are unsuccessful, the examiner's acting supervisor, Steven Loke can be reached on 571-272-1657. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAN or Public PAG. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAG system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

NP

08-04-05



NITIN PAREKH

PRIMARY EXAMINER

TECHNOLOGY CENTER 2800